Flood Plain Mapping in Iowa

In eight of the past 15 years Iowa has experienced flooding severe enough to result in Presidential Disaster Declarations. Despite this record of damaging floods, Iowa still lacks critical data on where flood waters will go. There is an urgent need to develop flood plain maps, according to the Governor's Institute on Community Design. Data does not exist for 47 counties and needs to be updated in the other 52.

After the floods of 1993, Army Brig. Gen. Gerald E. Galloway, a professor of engineering at the University of Maryland, led the White House study of the 1993 Mississippi River flood.

The general's study concluded that floods as large as the 1993 flood would probably occur again. It pointed out that people and properties were at risk, and that many did not understand the hazard they faced because the risks had not been well communicated. Adequate statewide flood maps can help communicate this risk.

The situation has not changed much since 1993. After the 2008 flood, Galloway said, "Efforts to require insurance for those living behind levees, to extend mandatory insurance requirements to other vulnerable areas and to better map flood risks all await action by Congress." In Iowa, we can take action.

> "When every minute counted, LiDAR generated accurate topographical maps used for predictive analysis during the 2008 summer floods. We were being asked to produce flood plain maps in minutes, not days. The readily available data prevented hundreds of thousands of dollars in damage. The data was crucial to protect real property."
>
> — David Croll,
> GIS Corrdinator,
> Johnston, IA

What can flood maps be used for?

Flood plain maps provide fundamental data on elevation of flood plains, which can be used for all kinds of decisions. The maps can protect lives and property both before and during a flood. Although there have been technical modifications and updates to the original paper maps of the 1970s and 1980s, current flood plain maps are often inaccurate and of low quality. Out of Iowa's 99 counties, only 52 are completely mapped.

Flood plain maps assist with emergency response and community planning, and can be used for such things as:

- Community land use planning and design purposes
- Insurance determinations
- Quickly allocating resources before or during a flood event

Flood Stage Inundation Maps help determine the boundaries of submerged areas based on different flood discharges before an actual flood. With this information available, cities can direct resources to critical areas before flooding occurs.

Iowa Wing, Civil Air Patrol and the Iowa Homeland Security and Emergency Management Division

Flood plain maps would not have saved downtown Cedar Rapids from extreme flooding in 2008. But maps did help communities like Cedar Rapids save lives as they evacuated people. Flood plain maps are badly needed in the 47 Iowa counties that do not have up-to-date information.

The Role of Flood Plain Mapping

Flood plain maps can be used to reduce the effects of a disaster in many ways. The following are just a few examples:

Planning: To avoid construction in flood-prone areas

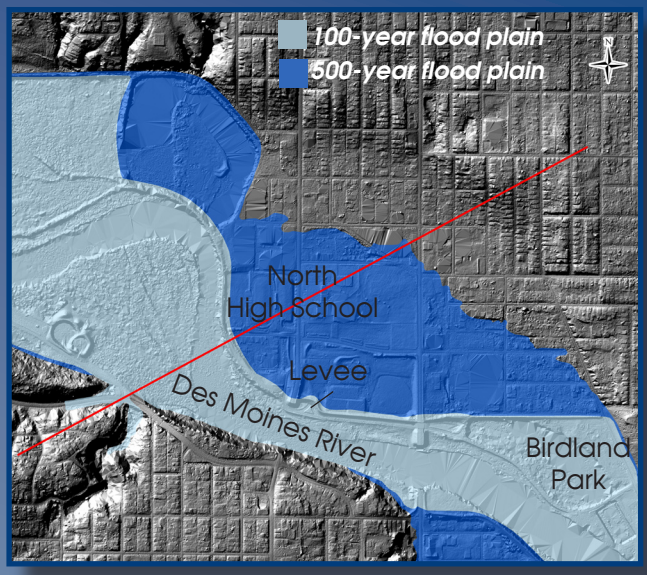
Preparedness: To develop an emergency action plan through the identification of homes, businesses and critical facilities

Response: To evacuate people and prioritize sandbagging in residential and business areas

Recovery: To help decision makers rebuild and allocate disaster assistance

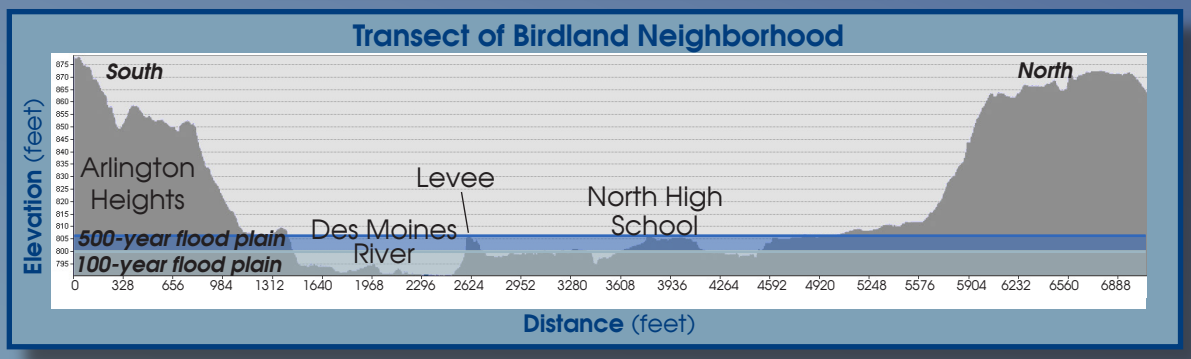
LiDAR Technology

Once again, in 2008, we learned that sufficient, accurate flood plain data is crucial for future flood preparation. In 2004, the state of Iowa invested in an innovative Light Detection and Ranging technology (LiDAR) for developing 2-foot interval topographic elevation maps for the entire state. With further advances in technology, LiDAR data could create flood plain maps that would be easily accessible to all state and federal agencies, and most importantly, to Iowa's citizens and businesses.



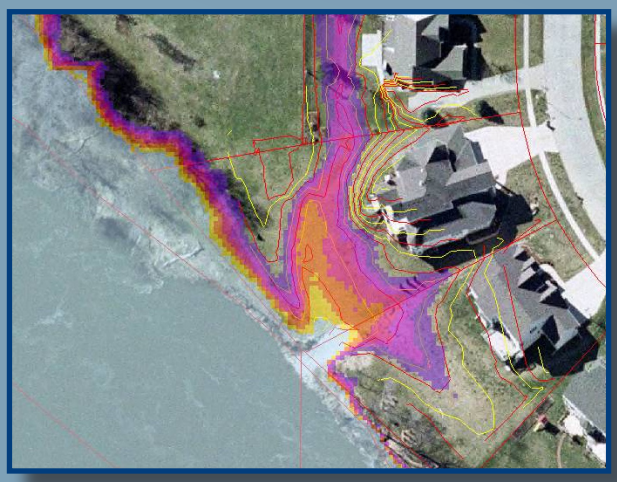
A flood plain map of the Birdland neighborhood in Des Moines was created with LiDAR data (left). It shows the areas that would be flooded by different water levels.

Using the same data, planners can create a cross-wise view (below) or transect to show how deep the water will get in specific locations.



What's the Next Step?

Under an existing contract, LiDAR has provided the data to develop both new and updated flood plain maps for all 99 counties. We now have the opportunity to use this foundation to create accurate flood maps and ensure a basic level of protection for all Iowans. For about $150,000 per county, or $15 million, every county in Iowa will have a published digital flood plain map.



Once digital flood plain maps are created, they can be used to zoom in and assess risks for individual buildings based on predicted levels of river crests.

For more information on developing flood plain maps or questions on LiDAR, contact:

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Partners

In 2004, the Iowa Department of Natural Resources along with the Iowa Department of Transportation, the Iowa Department of Agriculture and Land Stewardship, the United States Department of Agriculture Natural Resource Conservation Service and the State Pooled Technology Fund invested $6 million in Light Detection and Ranging technology to gather the most accurate elevation data available today.

Developed for RIO by DNR and HSEMD—August 2008